

# PATENT APPLICATION

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## TITLE OF THE INVENTION

"Locking Cover For Wells and Underground Tanks"

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## CROSS-REFERENCE TO RELATED APPLICATIONS

Priority of our U.S. Provisional Patent Application Serial No. 60/408,808, filed  
10 6 September 2002, incorporated herein by reference, is hereby claimed.

## STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

Not applicable

## REFERENCE TO A "MICROFICHE APPENDIX"

15 Not applicable

## BACKGROUND OF THE INVENTION

### 1. Field of the Invention

The present invention relates to manhole covers, particularly lockable covers for catch basins, wells, test wells, piping systems, sewerage systems, remote gasoline fill  
20 ports, and the like. More particularly, the present invention relates to an improved locking cover for a manhole, catch basin, well, test well or the like wherein a specially configured locking cover has interlocking portions that are spaced circumferentially apart, wherein one of the interlocking portions is a keyed lock that extends from the upper surface of the lid to the lower surface of the lid and that rotates a locking arm to a  
25 position under a shoulder of a shroud that receives the lid.

### 2. General Background of the Invention

The present invention provides a well shroud and security system. The shroud is disposed over the end of a well, e.g. an environmental monitoring well pipe, or water well pipe, or any well system or like ground opening. The shroud and well pipe can be  
30 set in concrete. The space between the housing and the well pipe is preferably filled with concrete below the end of the well pipe.

The shroud provides an interior ledge for receiving and supporting a locking cover that can be a hinged locking cover. The locking cover can also be a one piece cover that has a plurality of interlocking portions spaced circumferentially (for example, 180°) around the periphery of the lid. The shroud has an interior ledge or shoulder for receiving  
5 and supporting the locking cover.

A flexible gasket can be placed on the ledge or shoulder. The cover can be placed on the flexible gasket. The cover and flexible gasket are secured by means of a locking mechanism.

The cover thickness is preferably substantially the same as the distance from the  
10 top of the housing downwardly to the shoulder or ledge, so that when locked, the top is flush with the ground surface.

The locking device of the present invention can be recessed, preferably covered with a flexible gasket. The gasket helps seal out weather, unwanted elements, dirt, and debris from the keyed opening of the lock.

15 The hinge on the cover can be internal for a more secure shroud. The underside of the cover can provide a metal plate fastened to the underside of the lid with four bolts. The bolts can be positioned, for example, at corners of the plate for marking and engraving well numbers or other site specific information.

The present invention thus provides a lockable ground opening with an improved  
20 cover and locking arrangement that is preferably a hinged, flush mounted cover.

The hinge is preferably mounted inside the cover for security.

A top cover portion of the apparatus accepts a lock for security. The lock can be a redundant device for security purposes. The underside of the cover accepts a plate for site specific information. In one embodiment, the cover is a one piece unit that can be  
25 retroactively fitted to an existing shroud.

The following patent documents are incorporated herein by reference: U.S. Patent Nos.: 5,160,213; 5,324,135; 5,697,729; 5,950,368; 6,007,270; foreign patent document nos. JA 56-25524; JA61-58673; EP 420,777; JA6-248,660.

U.S. Patent No. 6,007,270 discloses a manhole frame with a hinged lid that has  
30 a lock on the side.

U.S. Patent No. 5,324,135 discloses a hinged locking lid for a ground opening.

U.S. Patent No. 5,697,729 discloses a locking lid for a ground opening.

U.S. Patent No. JA 56-25524 and EP 420,777 discloses locking lids for manhole covers that are pivoted or hinged.

#### BRIEF SUMMARY OF THE INVENTION

5           The apparatus of the present invention comprises a locking lid for wells and underground tanks. There are two embodiments disclosed herein. One embodiment includes the housing and the lid, wherein the lid is hinged to the housing and includes a keyed lock to lock the lid in place. The other embodiment is a retrofit lid which does not hinge, but that fits existing housing and locks in place with a keyed lock. In both  
10       embodiments, there is preferably a plate, on which pertinent information can be engraved, which can be bolted to the inside of the lid.

#### BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

          For a further understanding of the nature, objects, and advantages of the present invention, reference should be had to the following detailed description, read in  
15       conjunction with the following drawings, wherein like reference numerals denote like elements and wherein:

          Figure 1 is perspective exploded view of the preferred embodiment of the apparatus of the present invention, showing a hinged lid arrangement;

          Figure 1A is a partial perspective view of the preferred embodiment of the  
20       apparatus of the present invention, showing the shroud that operates with the lid of Figure 3;

          Figure 2 is a perspective exploded view of a second embodiment of the apparatus of the present invention;

          Figure 3 is a sectional, elevation view of the preferred embodiment of the  
25       apparatus of the present invention;

          Figure 4 is a sectional view of the second embodiment of the apparatus of the present invention;

          Figure 5 is a perspective view of the preferred embodiment of the apparatus of the present invention;

30       Figure 6 is a sectional view of a third embodiment of the apparatus of the present invention;

Figure 7 is a fragmentary view of the third embodiment of the apparatus of the present invention; and

Figures 8-9 are perspective exploded views of prior art well covers.

#### DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

5           Figures 1, 1A, 2 and 3 show the preferred embodiment of the apparatus of the present invention, designated generally by the numeral 10 in Figures 1 and 2. Locking ground opening cover apparatus 10 includes a shroud 11 that is fitted with a specially configured lid 12 having a locking mechanism 13. Lid 12 provides an upper surface 17 and a lower surface 18. A hinge 19 is attached to lid 12 generally opposite locking  
10           mechanism 13. The locking mechanism 13 preferably includes a key slot 14 for receiving a key 31 so that a user can access a well 30 or like ground opening by separating the lid 12 from the shroud 11 or by pivoting the lid 12 upon the shroud 11.

          The locking mechanism 13 preferably includes a locking arm 15 that is mounted to rotating section 16. In this fashion, a user opens lid 12 by placing the appropriate key  
15           31 in key slot 14 and rotates the rotating section 16 and locking arm 15 until the locking arm 15 is in an unlocking position that places it under lid 12 but removed from shoulder 22 of shroud 11.

          Shroud 11 provides a wall 20 having an inner surface 21 that faces toward the center of the ground opening that is to be covered. The inner surface 21 is preferably a  
20           cylindrically shaped surface for receiving a lid 12 that is preferably circular in shape. The periphery of lid 12 registers against and is closely spaced from the inner surface 21 of shroud 11. Shoulder 22 extends inwardly from the lower end portion of wall 20 and its inner surface 21. Shoulder 22 is preferably an annular shoulder that extends horizontally or perpendicular to inner surface 21. Shroud 11 can be connected (e.g. bolted) to  
25           wellhead shroud 24 that is preferably set at the ground surface, such as in a concrete mass 23. Figures 1, 1A, 2 and 3 show arrangements that can be retroactively fitted to an existing wellhead shroud 24. The existing wellhead shroud 24 has cylindrical side wall 26 and annular shoulder 27.

          In the embodiment of figures 1 and 2, the shroud 11 can be an existing shroud  
30           that occupies a position on the upper end portion of a well casing 27 or other elongated tubular structure that extends from the wellhead area downwardly into the well bore. The

casing 27 provides a casing bore that can include one or more other well pipes 29. This upper end portion of well pipe 27 that can be fitted with shroud 11 provides a wellhead area 33 with ground opening 32 that is to be covered so that access to the well pipe bore 34 is prevented.

5           In figure 1, shroud 11 has an annular shoulder 35 that provides annular surface 36 upon which lid 12 rests when it is in a closed position of figure 1A. Wellhead shroud 24 has an inner surface 25 and a larger diameter side wall 26. Side wall 26 provides inner surface 25 that surrounds lid 12 when it is closed as shown in figure 1A. Wellhead shroud 24 includes annular shoulder 35, annular surface 36, smaller diameter side wall 37, and can be attached to the upper end portion of well casing 27 using fasteners 38, for example.

Wellhead shroud 24 can have a plurality of existing openings 39 that, in the prior art, are used to bolt a cover 90 to wellhead shroud 24. Such a prior art arrangement is shown in figure 8.

15           Another prior art arrangement is shown in figure 9 wherein a circular lid 93 rests upon shroud 24 but is not fastened thereto, simply being retained in position by gravity.

In figure 1, shroud 11 can be attached to existing wellhead shroud 24 by drill and tapping new openings 40 and fastening shroud 11 to existing shroud 24 using a plurality of bolts 41.

20           In figures 1 and 1A, lid 12 has a periphery 42 that provides an annular groove 43 that fits the contours of shroud 11 when lid 12 is in the closed position of figure 1A. Lid 12 has recess 44 for receiving part of static locking member 45. An inwardly projecting part 47 of static blocking member 45 extends under lid 12 when it is the closed position of figures 1A and 3. In order to lock the lid 12 in a locking position of figure 3, key 31 is rotated so that locking arm 15 moves to a position under inwardly projecting part 47 as shown in figure 3. Static locking member 45 can be secured to shroud 11 using one or more fasteners 46.

25           In figure 2, a shroud 48 is similar in construction to the shroud 11 of figure 1. However, the shroud 48 of figure 2 provides openings 52 that align with existing openings 39 of wellhead shroud 24. Bolts or bolted connections 41 can be used to attach shroud 48 to wellhead shroud 24 at existing openings 39 on wellhead shroud 24.

Shroud 48 has a wall 49 that provides cylindrically shaped inner surface 50. Annular shoulder 51 receives the underside of lid 12 when the lid is in a closed position.

An additional embodiment of the apparatus of the present invention is shown in figure 4. In figure 4, a newly constructed apparatus 53 is provided so that the locking ground opening cover 53 is a newly built structure that is fastened with fasteners 38 to the upper end portion of well casing 27. Locking ground opening cover 53 provides shroud 54 having a hinge 55 that connects lid 56 to it. Lid 56 provides upper surface 57, lower surface 58 and has a locking member 13 that accepts key 31. As with the embodiment of figures 1-3, the locking member 13 provides a rotating member 16 and a locking arm 15. Shroud 54 has cylindrical surface 59 that engages the inside surface of well casing 27 as shown in figure 4. A flat annular surface 60 defines a part of shroud 54 that extends radially away from well casing 27. An inwardly projecting part 61 of shroud 54 is provided for engaging locking arm 15 when the locking arm 15 is rotated to a locking position shown in figure 4. In the position of figure 4, the lid cannot be removed because the locking arm 15 engages inwardly projecting part 61.

Lid 56 has an annular groove 62 that fits surfaces 63 and 64 of shroud 54 as shown in figures 4 and 5. The lower surface 58 of lid 56 rest upon flat annular surface 65 when the lid 56 is in a closed position of figure 4. An inner cylindrically shaped surface 66 defines an opening that enables access to ground opening 32 when lid 56 is in the open position of figure 27. Recess 62 can be defined by flat annular surface 67 and curved annular surface 68.

Another locking ground opening cover 70 is shown in figures 6 and 7. The embodiment of figures 6 and 7 differs from the earlier embodiments because no hinge is provided. The locking ground opening cover 70 provides a lid 71 that attaches to shroud 74 in an interlocking fashion. Lid 71 has upper surface 72 and lower surface 73. Shroud 74 has an outer cylindrical surface 75, flat annular lower surface 76, flat annular upper surface 77, cylindrical surface 78, flat annular surface 79, and cylindrical surface 80.

Projecting portion 81 extends inwardly from surface 80 as shown in figure 6. Projecting portion 82 is engaged by ell shaped locking member 85 that can be an integral part of lid 71. The ell shaped locking member 85 provides a tab 86 that extends below projecting portion 82 as shown in figure 6. Shroud 74 has a recess 83 that accepts

indexing tab 84. By placing indexing tab 84 in recess 83, an operator automatically aligns ell shaped locking member 85 with projecting portion 82. When so engaged, the lid 71 and shroud 74 are positioned so that projecting portion 81 aligns generally with locking mechanism 13. A user then rotates the key 31 and rotating part 16 of the locking mechanism 13 so that locking arm 15 occupies a position below projecting portion 81 thus preventing removal of the lid 71 from its position on shroud 74.

#### PARTS LIST:

The following is a list of parts and materials suitable for use in the present invention:

	<u>Part Number</u>	<u>Description</u>
10	10	locking ground opening cover
	11	shroud
	12	lid
	13	locking mechanism
15	14	key slot
	15	locking arm
	16	rotating section
	17	upper surface
	18	lower surface
20	19	hinge
	20	wall
	21	inner surface
	22	annular shoulder
	23	concrete mass
25	24	wellhead shroud
	25	inner surface
	26	Larger diameter side wall
	27	well casing
	28	casing bore
30	29	well pipe
	30	well

	31	key
	32	ground opening
	33	wellhead
	34	well pipe bore
5	35	annular shoulder
	36	annular surface
	37	smaller diameter side wall
	38	fastener
	39	existing opening
10	40	new opening
	41	bolt
	42	periphery
	43	annular groove
	44	recess
15	45	static locking member
	46	fastener
	47	inwardly projecting part
	48	shroud
	49	wall
20	50	inner surface
	51	annular shoulder
	52	opening
	53	locking ground opening cover
	54	shroud
25	55	hinge
	56	lid
	57	upper surface
	58	lower surface
	59	cylindrical surface
30	60	flat annular surface
	61	inwardly projecting part



	62	annular groove
	63	flat upper surface
	64	curved annular surface
	65	flat annular surface
5	66	curved annular surface
	67	flat annular surface
	68	curved annular surface
	69	
	70	locking ground opening cover
10	71	lid
	72	upper surface
	73	lower surface
	74	shroud
	75	cylindrical surface
15	76	flat annular lower surface
	77	flat annular upper surface
	78	cylindrical surface
	79	flat annular surface
	80	cylindrical surface
20	81	projecting portion
	82	projecting portion
	83	recess
	84	indexing tab
	85	ell shaped locking member
25	86	tab
	87	
	88	
	89	
	90	cover
30	91	bolt
	92	opening

All measurements disclosed herein are at standard temperature and pressure, at sea level on Earth, unless indicated otherwise. All materials used or intended to be used in a human being are biocompatible, unless indicated otherwise.

- 5       The foregoing embodiments are presented by way of example only; the scope of the present invention is to be limited only by the following claims.